

BOOK REVIEWS

RECENT STUDIES IN GEOPHYSICAL HAZARDS edited by M. I. El-Sabh, T. S. Murty, S. Venkatesh, F. Siccardi and K. Andah, Kluwer Academic Publishers, Dordrecht, 1994. No. of pages: 285. ISBN 0-7923-2972-4.

This volume is the outcome of a symposium held at the University for Foreigners, in Perugia, Italy, in 1991. It is intended as a contribution to the International Decade for Natural Disaster Reduction (IDNDR) and, according to the blurb, the fifteen papers selected for publication represent '... a unique overview of the state-of-the-science in ... climatic, atmospheric, hydrological and geological hazards'. The book aims to provide a reference source for scientists, engineers and policy makers.

The emphasis throughout is on the technical aspects of simulating, modelling, predicting and forecasting a selection of potentially hazardous geophysical processes, such as intense rainfall, storm surges, mass movements and seismic activity. There is still little to justify, or link, the contributions within the four main sections of the book, and some papers are so case-specific as to make it difficult to judge either the novelty or the transferability of the science. In a few instances, such as the papers on time-series analysis of temperature and precipitation in Barcelona and on mass movements in Nigeria, a clear hazard context is missing. Such displays of modern science and technology—on their own—are unlikely to

advance in a material way the objectives of the IDNDR. Some recognition of this is contained in the concluding report and recommendations of the meeting, although the account is too brief to be really useful.

Despite these reservations, there are several papers of wider interest. These include a descriptive account of the role of sedimentation in major Bangladesh floods and a splendidly comprehensive paper on snow avalanches in the Kaghan valley, Pakistan Himalaya, which does much to redress the dearth of literature on such hazards in the Third World. In one of the few papers with a direct message for policy makers, the author revisits earlier work on the effects of vegetation canopies on water flow to show how plants, such as reed grass, could be deployed in restricting the inland penetration of storm surges.

Who will buy this book? It is not sufficiently balanced to appeal to the natural hazards community and, in any case, specialists can read any paper in the *Natural Hazards* journal where they have all been separately published. Given the presence of five editors, more could have been done to improve the standard of written English and proof-reading, to avoid the eccentricity of an isolated abstract and, above all, to provide a better hazard context for the individual papers.

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ROCK WEATHERING AND LANDFORM EVOLUTION edited by D. A. Robinson and R. B. G. Williams, Wiley, Chichester, 1994. No. of pages: xi + 159. Price £85.00 (hardback). ISBN 0 471 95119 6.

Few groups of natural processes are of wider interest to earth and environmental scientists than those involved in rock weathering. Rock weathering processes play an essential role in the development of many landforms, in the production of terrigenous sediment, and in the formation of soils and mineral deposits; furthermore, they are of great significance to civil engineers and architects through their influence on ground conditions and on the durability of construction materials. Yet, paradoxically, the detailed nature of weathering mechanisms, and the relative rates at which they operate under different environmental conditions, remain relatively poorly

understood. Considerable advances in understanding have certainly been made during the past thirty years, largely through the wider availability of improved analytical techniques and the adoption of experimental approaches in weathering studies, but numerous issues remain unresolved.

This volume contains a collection of 28 papers which illustrate the current status of understanding of the relationships between rock weathering and landform development, and their implications. The majority of the contributions are based on presentations made at the Annual Conference of the British Geomorphological Research Group held at the University of Sussex in September 1992, with selected invited additions. The book is divided into six sections which contain between three and seven chapters, plus a useful introduction by the editors which provides an overview of recent advances in weathering studies. Section 1 focuses on weathering processes

and includes seven chapters which present both the results of original field- and laboratory-based research and appropriate reviews of existing published literature. The section opens with a review of granite weathering by Gerrard, and is followed by a comparative study of deep weathering in Ireland, Corsica and Brazil by Power and Smith. Experimental investigations of the effects of fire on rock weathering and of weathering due to short-term rock temperature fluctuations are described by Allison and Goudie and by Warnke and Smith, respectively. The nature and importance of crack propagation is discussed by Douglas *et al.* in the context of basalt weathering in Northern Ireland, while the importance of volcanic gases in the development of weathering rinds on adesitic blocks in Japan is the focus of a paper by Matsukura *et al.* The section ends with a paper by Viles and Pentecost which discusses the problems involved in assessing the sometimes ambiguous evidence concerning weathering action of lichens on sandstone surfaces.

Section 2 contains five papers which examine weathering processes in the context of the weathering of building stones in urban areas and coastal environments. Weathering of limestones and sandstones due to airborne deposition from polluted urban atmospheres is discussed by Inkpen *et al.* and by Smith *et al.*, respectively. The importance of saline spray and wave splash in the deterioration of marine masonry is convincingly demonstrated in the two following papers by Mottershead and Takahashi *et al.*, while Cooke provides a clear illustration of the role of rising groundwater tables in contributing to enhanced damage to buildings caused by salt weathering in Central Asia.

Section 3 includes four papers which examine the implications of weathering for dating and the elucidation of landscape development. Contributions by Swanteson, Sjöberg and Woodward *et al.* demonstrate quite different techniques for the characterization of weathered surfaces and weathered materials which can be used to provide a means of relative age dating, while Parish discusses some of the difficulties which weathering of feldspars and other minerals may present in the application of absolute dating methods such as luminescence dating.

Section 4 contains five papers which consider the relationships between weathering and landform development in humid tropical and arid environments. The first three papers, by Thomas, Teeuw, and McFarlane *et al.*,

follow a fairly traditional approach in their consideration of the relationships between humid tropical weathering profiles, geomorphic surfaces, and long-term landscape evolution. The importance of tropical weathering processes and their influences on the engineering properties of materials is demonstrated by Fan *et al.*, while Schmidt demonstrates the links between lithology, structure, differential weathering and the development of the plan morphology of cuesta scarps under arid weathering conditions. Section 5 contains four contributions which explore similar themes in the context of temperate environments, including chapters on sandstone weathering processes and phenomena (Robinson and Williams), Dartmoor tors (Ehlen), the development of weathering flutes on siliceous rocks (Williams and Robinson), and limestone weathering in the intertidal zone of Mallorca (Moses and Smith). The final section focuses on weathering and landform development in high latitude and high altitude environments, with chapters dealing with lithological and structure controls on the development of cirques and lake basins (Evans), joint control in the formation of sub-glacial rock steps (Rea), and silt production during weathering of metamorphic rocks in the southern Himalayas (Gardner).

The majority of the contributions are very well written and contain significant new insights and/or original research results. The editors have performed a first-rate job in maintaining a high standard of content and presentation. The book is well produced with the exception of a few half-tone illustrations (especially photomicrographs) which have lost detail. Extensive geographical and subject indexes are provided. I recommend this book as essential reading for anyone with the remotest research interest in weathering processes and related landform development. It should also be an essential purchase for all serious undergraduate libraries; given the length and high-quality content of the book (including some colour illustrations), the price is not unreasonable. Although it does not provide all of the answers, the book provides a valuable summary of many of the outstanding questions and uncertainties relating to weathering which remain to be addressed.

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THE PHYSICS OF GLACIERS, third edition, by W. S. B. Paterson, Elsevier, Oxford, New York and Tokyo, 1994. No. of pages: ix + 480. Price £25.00. ISBN 0080379443.

Glaciology has advanced enormously in the 13 years since the second edition of *The Physics of Glaciers* was

published, and a third edition was becoming desperately needed. This edition has been substantially rewritten and updated to incorporate these advances. As with previous editions, the book's aim is to explain the physical principles underlying the behaviour of glaciers and ice sheets. The author rightly makes no apology for introducing mathematics, though the mathematical context is not excessive and the book is dominated by text, tables and